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ON THE ṚK-PRĀTIŚĀKHYA 13.5-6

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ABSTRACT: This article deals with two analyses of Sanskrit sounds found in the *Ṛk-Prātiśākhya* 13.5-6. The first analyses certain consonants as being formed by combining some more primitive sounds, while the second analysis views complex sounds as being formed by a combination of various features. These are two different ways of explaining the complexity of phonetic features possessed by certain sounds. The article also clarifies the distinction between the notions of *nāda* "glottal resonance" and *ghoṣa* "oral resonance" and proposes that the first of these be equated with the phonetic feature of "voice", rather than the second. A lack of clear understanding of these two distinct notions has created problems of interpretation for many scholars.

1. In the thirteenth Paṭala of the Ṛk-prātiśākhya (RPR), we have two general analyses of sounds presented in the verses 5 and 6. These are presented as two different views held by different traditions or by different teachers. This paper attempts to discuss these analyses and similar analyses in other texts. Some related terminological issues are also discussed. The RPR 13.5 says: 'Some say that the voice (*ghoṣa*) of the voiced consonants (*ghoṣavat*) is the sound *a*, while [the voice] of the nasal consonants is the *anusvāra*. Similarly, the aspiration of the aspirated consonants is due to the corresponding homorganic (*sasthāna ūṣman*) sibilant, while [the aspiration] of the voiced [aspirated consonants] is due to the voiced sibilant [*h*].' In what follows, we shall discuss the problems posed by this analysis, with respect to the phonetic description given by the RPR and other treatises.

2. The first point to be noted is that the *anusvāra, ṁ,* is supposed by this tradition to constitute the voice (*ghoṣa*) of the nasal stops, *ṅ, ñ, ṇ, n* and *m* (see Uvaṭa on RPR (BHU) p. 690). The *anusvāra* as a constituent element of these sounds must also provide their nasality. This whole process implies that, for this tradition of phonetics, the *anusvāra* was a voiced sound. Otherwise, how could it provide voice to nasal voiced stops? This voiced character of the *anusvāra* is apparently not accepted by the author of the RPR himself. The RPR includes the *anusvāra* in the list of sibilants or fricatives, i.e. *h, ś, ṣ, s, ḥ, ḥ*(*k*), *ḥ*(*p*) and *ṁ* (RPR Vargadvaya, verse 10). The notation *ḥ* stands for the *visarga*, *ḥ*(*k*) for the *jihvāmūlīya* and *ḥ*(*p*) for the *upadhmānīya*. The RPR says that the last seven of the fricatives are unvoiced (*aghoṣa*), implying that all the fricatives except *h* are unvoiced (RPR 1.2). Hence the RPR itself cannot analyse the voice of the nasal consonants as coming from the element of the *anusvāra*. The RPR alone classifies the *anusvāra* as a nasal unvoiced fricative (*ūṣman*), while many other texts explicitly classify it as a voiced (*ghoṣavat*) sound, and not as a fricative.[1] However, within the RPR itself, there seems to be a contradiction involved in the conception of the *anusvāra*. The RPR says that the articulator of vowels, fricatives and the *anusvāra* is without contact (*aspṛṣṭa*) (RPR 13.3). Here, the *anusvāra* is mentioned separately along with *ūṣmans* 'sibilants'. If the *anusvāra* is itself a fricative, why should it be mentioned separately ?

3. It is possible that the *anusvāra* dialectally varied from a nasal unvoiced fricative to a nasal voiced sound. W. S. Allen points out that nasal fricatives are very rare.[2] The possibility of the *anusvāra* having a fricative character in some of the early dialects of Sanskrit is quite strong. According to the major *Prātiśākhyas,* the word-final *m* changes into an *anusvāra* only before sibilants and *r* (cf VPR 4.1; RPR 4.5) . This association with fricatives could have easily given a fricative color to the pronounciation of the *anusvāra.*[3] Pāṇini's grammar seems to indicate a non-fricative character of the *anusvāra.*[4] He makes a general rule that a word-final *m* changes to an *anusvāra* before any consonant [*mo'nusvāraḥ,* P.8.3.23]. This word-final *anusvāra* can be optionally changed to a sound homogeneous with the following stop or semi-vowel [*vā padāntasya,* P.8.4.59; *anusvārasya yayi para-savarṇaḥ,* P.8.4.58], but before sibilants and *r* it remains unchanged. Thus, an *anusvāra* can occur before non-fricatives as well. This difference in the distribution of the *anusvāra* appears to indicate a difference in its phonetic features.

4. In the RPR (13.5), we have an analysis of Sanskrit sounds which could be considered as an attempt to explain complex sounds in terms of simple sounds. The commentary of Uvaṭa on the RPR provides the following details (RPR (BUH) pp. 690-1). In the sounds *g, j, ḍ, d, b, y, r, l, v* and *h*, the feature of voice is provided by the element *a*. Similarly, the voice in *ṅ, ñ, ṇ, n* and *m* is provided by the element of *anusvāra*. In the sounds *kh, ch, ṭh, th* and *ph*, the feature of aspiration is due to the corresponding homorganic sibilants, i.e. *ḥ(k)*, *ś, ṣ, s* and *ḥ(p)*, while the aspiration in the voiced aspirates *gh, jh, ḍh, dh* and *bh* is due to the voiced sibilant *h*.

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[1] See *Āpiśali-śikṣā-sūtrāṇi,* p. 4; also : *Pāṇinīya-śikṣā-sūtrāṇi,* p. 13. Also see Durgasiṁha's *Kātantra-vivṛtti-ṭikā,* quoted by Eggeling, *Kātantra-vyākaraṇa,* p. 471. Hemacandra expresses the same view in his *Bṛhad-vṛtti, Hemaśabdānuśāsana,* p. 4.

[2] He refers to 'the incompatibility of friction and voice in Sanskrit' (Allen 1953:41). It may be noted that the RPR considers *ṁ* to be an *aghoṣa ūṣman* 'unvoiced fricative'. The texts which consider *ṁ* to be *ghoṣavat* 'voiced' do not consider it to be an *ūṣman* 'fricative, sibilant'. The only voiced sibilant in Sanskrit is *h*.

[3] The *sandhis* like *devāṁśca* from *devān ca* and *devāṁstu* from *devān tu* may perhaps indicate this fricative character of *ṁ*. The fricative character of *ṁ* with the assimilated feature of palatality or dentality of the following sound could have been represented by the sequences *ṁś* and *ṁs*. The SCA ii.26 says : '*N* becomes *visarjanīya* before surd palatal, lingual and dental mutes not followed by spirants.' 'That is to say, virtually, a sibilant is inserted before the mute, of the same class with the latter, and the *n* itself is replaced by the nasalization of the preceding vowel.' (Whitney on SCA p. 85). Pāṇini 8.3.2, 4 and TPR xv. 1-3 optionally prescribe insertion of *ṁ* after the preceding vowel. Whitney considers this insertion of a sibilant to be a 'no proper phonetic process' and tries to give a historical explanation by saying that in most of the cases the affix historically ended in (n)s. (For his detailed statistics, see : SCA p. 86-7). This procedure was eventually extended to those cases where the affix historically did not have a sibilant. Whitney's argument seems quite plausible, but the fricative character of *anusvāra* as given by the RPR may perhaps suggest a more proper phonetic explanation in synchronic terms.

5. Despite this explanation of Uvaṭa, many points are still very unclear. The element of voice is provided by *a* and *ṁ*, and the element of aspiration is provided by different sibilants. Thus, we can say that *g* is produced by a combination of *k+a*, and *ṅ* by the combination of *k+ṁ*. It seems that the voice of *a* is intended here and not its syllabic quantity. May be only a fraction of *a* is intended. Unfortunately there is no clear discussion anywhere on this point. The sound *kh* can be explained in terms of *k+ḥ(k)*. Normally the sounds *ḥ(k)* and *ḥ(p)* are considered to be dependent on the following sounds, i.e. *k, kh* and *p, ph*. But in the explanation of *kh* as a combination of *k+ḥ(k)*, the sequence is rather opposite. Actually no sequence seems to be intended and both the sounds are to be produced simultaneously. The sound *gh* also presents some problems. The text only says that the aspiration of voiced aspirates is provided by the voiced sibilant *h*, but does not clearly say where the element of voice comes from. If we accept Uvaṭa's explanation, the voice in *h* itself comes from *a*. Thus *h* seems to be a combination of the unvoiced *ḥ* and *a*, and may be represented as *ḥ+a*. Thus, the sound *gh* may be analytically represented as *k+(ḥ+a)*. This can explain its aspiration and voice together.

6. The relationship of the *anusvāra* and the nasal stops as given in the RPR (13.5) may be explored further. The RPR classifies vowels, sibilants and the *anusvāra* as being *aspṛṣṭa* 'without contact between the point of articulation and the articulator' (RPR 13.3). The *anusvāra* is called *nāsikya* 'produced in nose' (RPR 1.10), and no other point of articulation is mentioned. The nasalized vowels and consonants are called *rakta* 'colored' and are said to be pronounced by both mouth and nose (RPR 13.6; also cf P.1.1.8), but the *anusvāra* seems to be a pure nasal sound. Thus it may be said that in the pronunciation of the *anusvāra*, the nasal air-flow was a continuous unobstructed flow. The nasal stops like *ṅ* are called *sparśas* 'sounds with contact between the point of articulation and the articulator'. If they have the *anusvāra* as a component, then these sounds with contact have an element which is without contact. This at first seems contradictory. However, the contradiction may be explained away. These nasal stops have contact as far as the non-nasal or oral track is concerned, but the nasal track remains open in their pronunciation. This seems to be corroborated by the *Taittirīya-prātiśākhya* which says that the nasal coloring is given by the unclosing of the nose.[4] This is the picture that seems to emerge from the RPR.

7. Thus the series of stops may be represented as follows :

k *kh* = *k*+*ḥ*(*k*) *g* = *k*+*a* *gh* = *k*+ (*ḥ*+*a*) *ṅ* = *k*+*ṁ*
c *ch* = *c*+*ś* *j* = *c*+*a* *jh* = *c*+ (*ḥ*+*a*) *ñ* = *c*+*ṁ*
ṭ *ṭh* = *ṭ*+*ṣ* *ḍ* = *ṭ*+*a* *ḍh* = *ṭ*+ (*ḥ*+ *a*) *ṇ* = *ṭ*+*ṁ*
t *th* = *t*+*s* *d* = *t*+*a* *dh* = *t*+ (*ḥ*+*a*) *n* = *t*+*ṁ*
p *ph* = *p*+*ḥ*(*p*) *b* = *p*+*a* *bh* = *p*+ (*ḥ*+*a*) *m* = *p*+*ṁ*

These complex representations are not to be looked at as sequences of sounds, but rather as being pronounced simultaneously and thus yielding the desired complex of features. The air which obtains *nāda* 'voice, resonance' on account of the closure in the glottis is basically viewed by this tradition as constituting the pure *ghoṣa* 'voice, resounding, reverberating' and is represented by the sound *a*. The pronunciation of *a* does not involve any further modification except an open track through the mouth. This explains why *a* could be viewed as the pure *ghoṣa* 'voice'. When the same intonated flow of air was directed through the nose, it produced a nasal *ghoṣa,* which is represented by the *anusvāra.* Thus we find that these two sounds, with the first members of the series and sibilants are viewed as some kind of primary sounds. To this may be added other simple vowels. From these simple primary sounds, other sounds can be built up, and these built-up sounds may be viewed as secondary sounds.

8. Glimpses of similar analyses are seen in various texts on phonetics. For instance, the *Śaunakīyā Caturādhyāyikā* (i.10) (SCA) says that the second and the fourth of each stop-series are *soṣman.* This term can be simply rendered as 'aspirates', if we take the term *ūṣman* in the sense of aspiration, but *soṣman* may mean 'with a sibilant-component', if the term *ūṣman* is understood as referring to sibilants. The term is found used in both the meanings. Whitney understands the term *soṣman* in the sense of 'aspirates' and the term *ūṣman* in the sense of 'rush of air, expulsion of unintonated breath' (SCA p. 16). The commentary in Whitney's manuscript, at the point, quotes the following verse: *sasthānair ūṣmabhiḥ pṛktās tṛtīyāḥ prathamāś ca ye / caturthāś ca dvitīyāś ca sampadyanta iti sthitiḥ //* The verse can be translated as follows : 'The 'firsts' and the 'thirds' [of the series] which are combined with the homorganic sibilants become 'seconds' and 'fourths' respectively. This is how the matter stands.' Whitney accepts that 'the most natural rendering of *sasthānair ūṣmabhiḥ* would be 'with their corresponding *ūṣmans* or spirants,' but warns against such an interpretation : 'but this is hardly to be tolerated, since it would give us for example, *ts* and *ds,* instead of *th* and *dh*.[5] Whitney should have

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[4] See Whitney's comment on TPR ii.52 p. 81.

[5] Ibid. Whitney's problem is to some extent solved by the expression *pṛktāḥ* which means 'fused'. Thus *ts* for *th* is not a real problem. The combination of a dental unvoiced stop and dental unvoiced aspiration yielding a dental unvoiced aspirated stop is a good explanation. In fact the notation *th* is more confusing, since *h* contains *ghoṣa* 'voice,' while *th* does not.

objected to the doctrine laid down in the verse, rather than objecting to the rendering of the verse. Despite his warning, the verse means exactly what he is afraid of. The analysis of this verse may be represented as follows :

k *kh* = *k*+*ḥ* (*k*) *g* *gh* = *g*+*ḥ* (*k*) *ṅ*
c *ch* = *c*+*ś* *j* *jh* = *j*+*ś* *ñ*
ṭ *ṭh* = *ṭ*+*ṣ* *ḍ* *ḍh* = *ḍ*+*ṣ* *ṇ*
t *th* = *t*+*s* *d* *dh* = *d*+*s* *n*
p *ph* = *p*+*ḥ* (*p*) *b* *bh* = *b*+*ḥ* (*p*) *m*

This analysis of voiced aspirates is significantly different from the one found in the RPR 13.5. Here the voiced non-aspirates are not reduced to some other more primary sounds, but are treated themselves as primary sounds. To these voiced non-aspirates are added the unvoiced sibilants produced in the same point of articulation. This is different from the RPR 13.5, where the voiced sibilant ***h*** is added to the unvoiced non-aspirate to derive the voiced aspirate sounds. The commentary in Whitney's manuscript also says : 'another has said, 'the fourths are formed with *h*' (SCA p. 16). This doctrine seems to be similar to the RPR 13.5, but apart from this single statement, we do not know anything else about this 'other view'.

9. The same commentary in Whitney's manuscript of the SCA quotes another tradition. This is Whitney's translation : 'Some knowing ones have said that there are five 'first' mutes; of these, by the successive accretion of secondary qualities (*guṇa*), there takes place a conversion into others. They are known as seconds when combined with the qualities of *jihvāmūlīya*, *ś*, *ṣ*, *s* and *upadhmānīya*. The same when uttered with intonation are known as 'thirds', and these, with the second spirant, are known as 'fourths'. When the 'firsts' are pronounced with intonation, and through the nose, they are called 'fifth' mutes. Thus are noted the qualities of letters.' (SCA p. 261). This is quite similar to the analysis in the RPR 13.5, though there is more emphasis here on *accretion of qualities*, rather than accretion of other sounds. This tradition does not speak of *a* as constituting the *ghoṣa* 'voice', but speaks of 'uttered with intonation'. The analysis of voiced aspiraes is rather ambiguous, unless the term 'the second spirant' refers to ***h***. The *Ṛktantra* (RT, ascribed to Śākaṭāyana) contains some textually ambiguous passages which seemingly express views similar to the RPR 13.5.[6] This is the only other text which appears to say that *a* constitutes the *ghoṣa* 'voice' of the voiced consonants. The *Śikṣā-sūtras* ascribed to Āpiśali and Pāṇini also support the view that the 'seconds' are formed with homorganic sibilants, while the 'fourths' are formed with ***h***.[7] *The Vājasaneyi-prātiśākhya* (VPR) i.54 is identical with the SCA i.10 : 'The seconds and fourths are *soṣmans* 'with *ūṣman*'. As noted above, the term *ūṣman* may refer to 'rush of air' or to "sibilants".

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[6] cf RT 1.4; also Sūrya Kanta's notes to RT p. 7.

[7] *Āpiśali-śikṣā-sūtrāṇi* p. 4; also : *Pāṇinīya-śikṣā-sūtrāṇi* p. 14.

10. Uvaṭa also says that the feature of voice in the semi-vowels *y*, *v*, *r* and *l* is produced by the element *a* (RPR (BHU) pp. 690-1). These sounds may be said to come from the combinations *i-a, u-a, ṛ-a* and *ḷ-a* respectively. Since the element *a* is held as providing the feature of voice (*ghoṣa*), it may appear that the vowels *i, u, ṛ* and *ḷ* do not have the feature of (*ghoṣa*). Now are we to say that these vowels are voiceless? This creates a terminological problem which needs a detailed discussion.

No *Prātiśākhya* considers vowels to be *ghoṣavat* 'with *ghoṣa*'. The texts agree that vowels and *ghoṣavat* 'voiced consonants' have in common the emission of *nāda* 'intonated breath, resonance', produced by the glottis remaining closed (*saṁvṛta*).[8] Thus, vowels and voiced consonants (*ghoṣavat*) share the feature of *nāda*, and are yet represented as two distinct classes differing in the feature of *ghoṣa*. In modern terminology, the Sanskrit vowels are also voiced sounds. Thus the problem lies in exactly translating and distinguishing the term *nāda* and *ghoṣa*.

11. This question has perplexed scholars for over a century and no satisfactory solution has come out so far. Whitney remarks: 'The vowels are not included under the designation *ghoṣavat*, 'sonant', although formed of the same material with the sonant consonants.' (TPR p. 17). The commentaries on the TPR say that, according to the TPR, vowels are neither to be termed *ghossṣavat* 'having *ghoṣa*' nor *aghoṣa* 'without *ghoṣa*'. Modern scholars have not been able to make any clear distinction between *nāda* and *ghoṣa*.[9] Allen (1953:34, fn 2) says: 'Whilst *ghoṣavat* and *aghoṣa* are generally used for 'voiced' and 'voiceless', the usual term for voice is *nāda* and not *ghoṣa;* this fact leads to misunderstanding on the part of later writers, who list *nāda* and *ghoṣa* as separate processes — e.g. Siddh. Kaum. 12.' With this notion of identity of *nāda* and *ghoṣa,* Allen translates the SCA i.12-13 as follows: 'Breath is emitted in the case of the voiceless consonants, and voice in the case of the voiced consonants and vowels.' Such a translation is rather confusing, since it makes us believe that vowels are not termed 'voiced' though they have the emission of voice. The *Prātiśākhyas* seem to say that there is a featural difference between vowels and voiced consonants, despite the fact that they share the feature of *nāda*. Thus, vowels have *nāda*, but not *ghoṣa*, while the voiced consonants (*ghoṣavat*) have both the features.[10]

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[8] cf TPR ii.4,8; SCA i.13; RT i.3; VPR distinguishes *svara* from *dhi* which is identical with *ghoṣavat* of other texts, e.g. VPR iv.35; cf also APR iii.1; and Uvaṭa on RPR 13.2.

[9] See TPR i.12-4; *Tribhāṣyaratna's* comment on TPR p. 17; also: *Padakramasadanabhāṣya* on TPR (Md) p. 5, and *Vaidikābharaṇa* on TPR (My) pp. 19ff. Though vowels are not *ghoṣavat,* still TPR ii.8 accepts that vowels do have *nāda* as their emitted material (*anupradāna*). TPR ii.6 says that if the glottis is neither closed, nor open, but in between, then the sound *h* is produced, which is classified as a distinct third class of emitted material, different from *śvāsa* 'unintonated breath' and *nāda* 'intonated breath, voice'. This type of emitted material is shared by *h* and the fourths of the stop-series, see: TPR ii.9. Other texts treat *h* somewhat differently. The RPR 13.1-2 says that if the glottis is in an intermediate position, then both *śvāsa* and *nāda* are produced, and both of these are shared by voiced aspirates and the voiced sibilant *h*. The SCA does not treat *h* independently.

12. At this point, it is important to look into the history of the term *ghoṣa*. Though we cannot possibly speak in terms of definite dates, we can certainly see the changing semantics of the term *ghoṣa*. At one place, the *Aitareya-āraṇyaka* uses the term *ghoṣa* in the general sense of 'sound'[11]. Then, in the same text, we come across a classification of sounds into *ghoṣa, ūṣman* and *vyañjana* (cf AA ii.2.4). The last two terms mean 'sibilants' and 'consonants' respectively. The term *ghoṣa* is interpreted by Keith and Chatterji to stand for vowels.[12] In support of this interpretation, we find that the *Chāndogya-Upaniṣad* ii.22.5 says that vowels should be pronounced *ghoṣavat* 'with *ghoṣa*'.[13] Thus, whatever the exact

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[10] Eduard Sievers is the only western phonetician known to me who has recognized a similar feature, distinct from voice. In his *Grundzüge der Phonetik* (Leipzig, 1881, p. 115), he says : 'In the case of the voiced stops, a trapping of the voiced expiratory stream follows in the closed chamber formed by the mouth-cavity. It is in this manner that a so-called *Blählaut* ('a blowing, puffing sound') is produced, the onset of which can appear in the case of all vowels, though usually only lightly, and seldom with the same strong onset as (in the case of voiced stops).' Sievers' *Blählaut* appears to be a very close approximation of the concept of *ghoṣa* in Sanskrit phonetics, which he differentiates from *Tone* 'voice'. Sievers' description of this *Bläulaut* can to some extent explain why the Sanskrit phoneticians ascribed both *nāda* and *ghoṣa* to voiced consonants, and only *nāda* to *vowels*. We could say that we have light or almost no *ghoṣa* with normal vowels, and strong *ghoṣa* with voiced consonants. [I thank Prof. Catford for referring me to Sievers' *Phonetik*.]

[11] AA ii.2.2; Chatterji 1948:238.

[12] AA p. 215 fn 3; Chatterji 1948:239.

[12] And also *balavat* 'with particular strength'. This added strength could be looked at as the reason for the appearance of *ghoṣa* with vowels, which they do not have in normal pronounciation. Thus, it is quite probable that this mention of *ghoṣa* in connection with strong (*balavat*) vowels may perhaps be an extension of the nomal scope of *ghoṣa*, instead of the term *ghoṣa* changing its scope in later times from vowels to voiced consonants.

In order to understand this possibility, we have to realize that *bala* is a technical term of Sanskrit phonetics found in early times, but lost later on. The *Taittirīya-Upaniṣad* (1.2) lists the following subject headings of a *Śikṣādhyāya* : *varṇaḥ* 'sound', *svaraḥ* 'pitch', *mātrā* 'quantity', *balam* 'strength', *sāma* 'continuity' and *santatiḥ* 'euphonic combination, continuous recitation'. It is clear from this passage that *bala* 'strength' is distinct from accent and quantity (= length). This text does not further specify the nature of *bala*. Moving from this *Upaniṣad* to the *Aitareya-Āraṇyaka*, we find a little more specific context for *bala*. The AA 3.2.6 says : 'Of that (Vedic) *Saṁhitā*, the letter *ṇ* is the *bala* 'strength', the letter *ṣ* the *prāṇa* 'breath', the self. He who knows the verses in the *Saṁhitā* and the letters *ṇ* and *ṣ*, he knows the *Saṁhitā* with its breath and its strength.' If we ask ourselves the question as to why *ṇ* and *ṣ* could have been chosen as the representatives of the features of *bala* 'strength, intensity' and *prāṇa* 'breath, aspiration', the answer may not be too difficult. The retroflex (*mūrdhanya*) sounds, which are incidentally of non-Aryan contribution to OIA, require more effort compared to other consonants. Of all the sibilants, *ṣ* requires maximum aspiration (= fast unvoiced breath), while the nasal retroflex meaning of the term *ghoṣa*, it did apply to vowels in these early times. Chatterji (1948:239) has rightly noted that 'the sense of *ghoṣa* was next shifted from 'vowels' to 'voiced consonants' as is clear from the *Prātiśākhyas*'. In the *Prātiśākhyas* and *Śikṣās*, the term *ghoṣavat* is consistently applied to voiced consonants alone, and not to vowels.[14]

13. This opens up the possibility that at this stage of Indian phonetics, there must be some difference between the notions of *nāda* and *ghoṣa*, such that *nāda* sometimes produces *ghoṣa*, but not always. The *Prātiśākhyas* do not clearly distinguish these two, but they seem to be produced in a definite sequence. Chatterji (1948:239) tries to make some distinction between them : 'It will appear from this that *śvāsa* and *nāda* refer to the speaker and *ghoṣa* and *aghoṣa* refer to the hearer; in other words, *ghoṣa* and *aghoṣa* are acoustic effects of *śvāsa* and *nāda* respectively.' However, this would mean that there is one to one correspondence between sounds with *nāda* and sounds with *ghoṣa*, an implication which runs contrary to the terminological usage of the *Prātiśākhyas*.[15] The *Śikṣāsūtras* ascribed

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stop *ṇ* exhibits maximum intensity of contact and the resulting *ghoṣa*. What is not clear is whether *bala* refers to the strength of the contact of the point and the articulator, or to the strength of the emission of voice (*nāda*). If we look back at the use of the term *balavantaḥ* 'with strength' in the context of vowels in the *Chāndogya-Upaniṣad*, we may find a basis to discount the first alternative, since vowels do not involve contact (*sparśa*). Thus, we may be justified in identifying *bala* with the intensity of the voiced expiratory stream, in contrast with *prāṇa* which refers to the intensity of aspiration, cf. the terms *alpa-prāṇa* 'with less aspiration' (= unaspirated) and *mahā-prāṇa* 'with greater aspiration' (= aspirated). The RPR (*Upodghāta*, verse 4) refers to this doctrine of *ṇ* and *ṣ* representing *bala* and *prāṇa* respectively (*prāṇaḥ ṣakāro yac ca balaṁ ṇakāraḥ*). On this passage, Uvaṭa interprets *bala* as the contact (*sparśa*) involved in *ṇ*. However, as shown above, the interpretation of *bala* as 'intensity of voicing' has more supporting evidence than Uvaṭa's interpretation. Thus the intensity of the voiced expiratory stream appears to be another variable determining the intensity of *ghoṣa* "oral resonance", as it can be inferred from the phonetic terminology in the pre- and non-systematic texts. This feature of *bala* being somewhat supra-segmental and less a core feature as compared to aspiration seems to have lost its ground in the systematic phonetics as seen in the later texts.

[14] TPR ii.8; SCA i.13; RT i.3,6; *Vyāsa-śikṣā* verse 6; APR iii.1; VPR iv.35; *Caturthī Pārāśarī Śikṣā, ŚS*, p. 58; *Hema-śabdānuśāsana*, p. 4; *Kātantra* i.1.12, and the listing : *ga-gha-ṅa-ja-jha-ña-ḍa-ḍha-ṇa-da-dha-na-ya-ra-la-va-ha*, Durgasiṁha's *Vṛtti*, *Kātantra* p. 4.; MB, Vol. I., Sec. I., p. 153; *Āpiśali-śikṣā-sūtrāṇi*, p. 4.

[15] Also it seems that for Chatterji there is no substantial difference between the two : 'Phoneticians took charge of *ghoṣa* and *nāda* and used them in the sense of 'voice' '. (Chatterji 1948:237). Indeed there are texts which seem to correlate the *saṁvṛta* 'closed' and *vivṛta* 'open' modes of glottal aperture directly with *ghoṣa* and *aghoṣa*. For instance : RT i.3, and *Pāṇinīya-śikṣā*, verse 20, ŚS p. 380. But these texts do not call vowels *ghoṣavat*. cf RT i.3. Another strange phenomenon may be noted. In non-*Prātiśākhya* texts there are hardly any references where vowels are described as having even the *saṁvṛta* 'closed' glottis and the emission of *nāda*. This has prompted some of the recent traditional grammarians to declare that vowels have only accents as their external efforts (*bāhya-prayatna*), and other external efforts including modes of glottis, emission, voicing and aspiration pertain only to con-

to Āpiśali and Pāṇini refer to a different phonetic tradition concerning these concepts:[16] Others, however, say : The *anupradāna* 'emission', 'phonetic material' is like resounding of a bell. When *nāda* is contributed to the sound (*dhvani*) produced by [the air] hitting the point of articulation, then by the combination of *nāda* and this sound, *ghoṣa* is produced. When *śvāsa* is contributed [to the sound produced by the air hitting the point of articulation], then by the combination of *śvāsa* and that sound, *aghoṣa* is produced. These are the properties of being *ghoṣavat* and *aghoṣa*.'

14. From this explanation in the *Śikṣā-sūtras* ascribed to Āpiśali and Pāṇini, I have the following *hypothesis* to explain, why vowels have *nāda* but not *ghoṣa*, and the voiced consonants have both these.[17] The terms *nāda* and *ghoṣa* both stand for the feature of resonance, resounding, reverberating. The only difference is that they seem to be produced at different stages. The closure in the glottis produces resonance in the air-flow. The glottal chords vibrate and that produces resonance. This glottal resonance is *nāda*. The stops have contact (*sparśa*) between the point of articulation and the articulator, while the semi-vowels are described by the RPR as having obscured contact.[18] When the air with glottal

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sonants (see *Śikṣā-śāstram* p. 13). Phatak (1972:162) says that according to Patañjali vowels had *saṁvāra* 'closeness of glottis', *nāda* 'emission of intonated breath', *ghoṣa* 'voice' and *alpa-prāṇa* 'little aspiration' as their external efforts. Patañjali has never stated this directly, and Phatak's statement is based on inferences drawn by Kaiyaṭa and Nāgeśa. On P. 7.1.39, Patañjali discusses the loss of the locative affix in examples like *carman*. The locative affix is *Ṅi*, or *i*. Patañjali says that if there should be *pūrva-savarṇa* substitute, a substitute homogeneous with the preceding sound, for *i*, then by the reason of maximum similarity, *d* would be substituted for *i*. (MB, Vol. III., p. 48.) The whole series of *t* is homogeneous with *n*, but of all these five stops, Patañjali considers only *d* to be featurally the most similar sound with *i*. Nāgeśa thinks that this passage is an indication that, for Patañjali, vowels had the features of *nāda*, *ghoṣa*, *saṁvāra* and *alpa-prāṇatva*. Of the sounds *t*, *th*, *d*, *dh*, and *n*, only *d* and *n* have these features. But since *i* is not nasal, *d* is closer to *i* than *n*. (*Laghuśabdendu-śekhara*, p. 116). This argument is not quite valid. Even if *i* and *d* only have *nāda* in common, and they differ in having *ghoṣa*, still *d* alone would be the most similar sound with *i*. The sound *t* is not *ghoṣavat*, but it has no *nāda* either. The passage in the *Bhāṣya* minimally requires that vowels have *nāda*, and they be non-aspirates (*alpa-prāṇa*), and it cannot prove that vowels were *ghoṣavat* for Patañjali. Nāgeśa also refers to Patañjali's comments on P. 1.4.108 as an indication to the same effect. But that passage is again not a clear indication.

[16] *Āpiśali-śikṣā-sūtrāṇi*, p. 7. Also : *Pāṇinīya-śikṣā-sūtrāṇi*, p. 17.

[17] I must clarify that this hypothesis is not a direct interpretation of any particular text. It is suggested by the above mentioned passage in the *Āpiśali-śikṣā-sūtras*, and appears to explain best the descriptive patterns in Indian phonetics.

[18] RPR 13.3. Other texts describe semi-vowels as being *īṣat-spṛṣṭa* 'slightly in contact'. This is not too different from *duhspṛṣṭa* in the RPR. At this point a peculiarity concerning *h* must be noted. All the texts consider *h* as a *ghoṣavat* sound. In its pronunciation, the glottis is in an intermediate position and hence we have both *śvāsa* and *nāda*. However, as a sibilant (*ūṣman*), its internal effort must be either *aspṛṣṭa* 'non-contact', *vivṛta* 'open', *iṣad-vivṛta* 'slightly open' or *ardha-spṛṣṭa* 'with half-contact'. In any case, this is different from all the other *ghoṣavat* sounds, which are mostly stops and semi-vowels.

resonance hits the point of articulation and the articulator with full or partial contact, it further resonates, due to the obstructing closure. This secondary resonance is *ghoṣa*. The RPR 13.3 considers vowels to be *aspṛṣṭa* 'without contact' between the point of articulation and the articulator.[19] This means that the flow of the air with glottal resonance does not encounter another closure, and it does not get this secondary resonance. If the glottis is open, then the flow of air does not resonate either in the glottis or further up in the oral track. These are called *aghoṣa* 'without *ghoṣa*'. Thus, in general, it appears that *nāda* refers to glottal resonance, while *ghoṣa* refers to the secondary resonance in the oral track. Thus if we want to use the modern term 'voice', it should be used with respect to this *nāda* 'glottal resonance', or 'laryngeal hum' as Surya Kanta calls it (RT, Notes, p 6). Thus, vowels and *ghoṣavat* consonants are all voiced sounds. The term *ghoṣavat* really seems to mean 'sounds with the secondary resonance', but these invariably have 'voice' or glottal resonance (*nāda*). Similarly, the term *aghoṣa* literally means 'sounds without secondary resonance', but it is conventionally used to refer to those sounds which have no resonance anywhere, and hence stands for unvoiced sounds. Though the *Prātiśākhyas* do not explain these terms exactly in the way described above, the overall terminological usage of the *Prātiśākhyas* would suggest a similar explanation.

15. Coming back to the RPR 13.5, it may be said that this tradition considers features of complex sounds as being produced by their constituent simple sounds. The RPR 13.6 presents a different tradition. It stresses that sounds with complex features are not produced by combining different simple sounds, but rather different features like *ghoṣa* 'resonance' and *ūṣman* 'aspiration' are produced along with other features of those sounds. Similarly, the nasalized sounds (*rakta* 'colored') are simultaneously produced through nose and mouth. In the case of aspirated stops, the *prāṇa* 'breath' comes out faster (*śīghratara*). This usage of the term *prāṇa* in the context of aspiration is closely related to the terms *alpa-prāṇa* 'with little breath' and *mahā-prāṇa* 'with greater breath' for non-aspirated and aspirated sounds in other texts.[20]

The featural analysis as presented in RPR 13.6 is simpler than the composite-sound analysis in RPR 13.5. The composite-sound analysis involves unnecessary duplication. For instance, *ch* is described as being constituted by *c* and *ś*. Here, we are adding palatal aspiration to a palatal stop, while all that we need to add is simple aspiration. The complex-feature analysis adds only the feature of aspiration (*ūṣman*). The composite-sound analysis uses *a* for voice, but we do not need, or rather we have to subtract, the feature of vocalicity. The complex-feature analysis only adds the feature of voice. Despite this simplicity of the complex-feature analysis, the composite-sound analysis has been adopted by a number of texts in Indian phonetics.

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[19] Other texts also classify vowels as having *vivṛtatva* 'openness' as their internal effort.

[20] Also see : *Āpiśali-śikṣā-sūtrāṇi* p. 7-8; *Pāṇinīya-śikṣā-sūtrāṇi* p. 17; *MB* Vol. I., Sec. I., p. 153.

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